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Editorial

Training in Interventional Neuroradiology

Needs are created by the availability of services and not the other way around. That is, like many other "needs" in our life, often created as a result of technical developments, we now find ourselves considering what needs to be done to provide the services that use intravascular techniques for the treatment of certain vascular disorders involving the brain and spinal cord, as well as the orbits and other structures of the head and neck.

Background

After 1960, when Luessenhop and Spencer [1] proposed and carried out embolization of the feeding arteries of arteriovenous malformations of the brain, little happened in this area for the next several years. At the International Symposium Neuroradiologicum that took place in Gothenburg, Sweden, in 1970, a few presentations dealt with the subject of possible embolizations through catheters inserted percutaneously into the carotid arteries or the femoral arteries to treat arteriovenous malformations [2] and possibly to diminish the vascularity of certain extremely vascular tumors. However, these embolizations had to be carried out by releasing the spheres at a distance from the abnormality, and this did not allow for proper control of where the spheres would go and which vessels would finally be obstructed. A number of methods were tried, including the use of magnetic-tipped thin catheters coupled with manipulated magnetic fields outside the head to try and entice the catheters into smaller vessels to improve the control of the embolization [3]. However, these did not work as well, and it was really Serbinenko [4] who gave a tremendous boost to the technology of intravascular navigation techniques with the development of the small balloons that could be navigated distally, inflated, and then detached. Progress after Serbinenko's report was relatively rapid, and within the next 10 to 12 years much development took place. Today, we find ourselves considerably better equipped for the purpose. In addition to more sophisticated equipment, we have more knowledge as a result of the accumulated experience of a number of individuals who have carried out a large number and variety of procedures designed to cause partial or complete occlusion of many of the vascular abnormalities. Now that these services are becoming available, the need to provide and expand them has been widely recognized, and a number of institutions are in the process of developing the appropriate backup and support and are recruiting the requisite staff.

How Should Interventional Neuroradiologists Be Trained?

Obviously, to provide optimal services we must have trained individuals who are able to perform the procedures with a minimum of complications and who, at the same time, will continue the research necessary to develop the field further. Such research must be considered an indispensable component of training because there is so much yet to be developed and learned in terms of equipment, embolization materials of all types, and the pathology and pathophysiology of the various abnormalities involving the vascular system; and all of this must be carried out by persons who are already basically trained in medicine and in the imaging field in the broadest possible way, and who also know the nervous system.

Some [5] have said that it is not necessary to provide radiology training for these specialists, and others have said that it is not necessary to train them fully in neurosurgery. Perhaps all they need to do is learn how to handle catheters, know the cerebral vascular system, be familiar with the various types of embolization materials, both solid and liquid, and "know how to step on the switch" to carry out fluoroscopy, as all these procedures must be done under complete and sophisticated radiologic imaging control. They do not really have to know much about X-rays, image intensification, subtraction techniques, and digitally controlled procedures in general. They do not really have to know anything about CT, MR imaging, plain-film examinations, and myelographic and cysternographic techniques, or anything about how we got where we are. The same proponents might say that as long as these specialists can do angiograms and know the vascular system of the brain, the specialists need not be broadly trained or know about *all* the diseases that affect the nervous

system as it concerns diagnostic imaging; nor do they need an in-depth knowledge about differential diagnosis of all these conditions. It appears to me that what these specialists do *not* need to know or be trained in has been emphasized more than what they *do* need to know well. And all this only in the interest of shortening the training period. If we were to follow this philosophy for neuroradiology, we would graduate from medical school; take 1 year of neurology; 2 years of skull and spine X-rays (never mind the rest of the skeleton), CT and MR of the head and spine (never mind the rest of the body), myelography, and neuroangiography (no need for general angiographic approaches); and we would be finished in 3 years. This approach would mostly leave holes in our training. And, by the way, what would these individuals be called? Radiologists? No. Neurologists? No. Neurosurgeons? No. Neuroradiologists? No. Who would claim this group?

Those who wish to shorten the training period forget that the basic concept of learning (and remembering what one learns so that one can apply it) is a combination of concentration, effort, and time. During World War II, the medical school curriculum was shortened to 3 years to produce more doctors quickly; however, this was abandoned soon, mostly because it became apparent that a lower grade of physician resulted. In clinical medicine, we work with the medical problems that come to us, and there is nothing we can do to accelerate this process. Time alone provides the opportunity to become involved in new techniques as the patients present themselves.

It is my belief that interventional neuroradiology should remain part of neuroradiology. That neurosurgeons may also be interested in developing skills in this area is natural, and I believe that the ongoing discussion to establish availability of training for neurosurgeons who wish to become involved is a good development. However, I believe also that the neurosurgeons will remain neurosurgeons and that they will qualify for the corresponding board of the specialty of neurosurgery. By the same token, I hope that those individuals in radiology who wish to pursue special training will qualify for the boards in radiology, and if, in the future, boards develop in neuroradiology that they also qualify for these boards. That the training would be longer for neuroradiologists who wish to become interventional neuroradiologists is only natural, for these individuals need added skills and thus they require further training and more time for experience to develop. Were we to compromise on the formation of neuroradiologists by allowing a group of individuals to bypass the needed training in general radiology and in classical neuroradiology, we would be compromising on quality and thus hurting the subspecialty that we have worked so hard to develop and maintain with the highest possible standards of training and performance. "*Let us not throw the baby out with the bath water.*" Let us not weaken neuroradiology only for the sake of shortening the length of training. Interventional neuroradiology falls between two fields, neurosurgery and neuroradiology, and it needs strong support from both. I believe that if we produce fully trained individuals, neuroradiologists have a chance of prevailing in the long term. It is doubtful that this would be possible if we have individuals who are half-trained in radiology and half-trained in neurosurgery, but not fully trained in either. A minimum training period for an interventional neuroradiologist would be 1 year of internship, 3 years of general radiology, 1 year of neuroradiology, and 2 more years of interventional neuroradiology (including the equivalent of 1 year in neurosurgery).

What's in a Name?

Another question that I hear and read about concerns the choice of the appropriate name for this interdisciplinary branch. Should this be called *interventional neuroradiology*, *therapeutic neuroradiology*, or *surgical neuroangiography*, as has been proposed by some? *Therapeutic neuroradiology* has the problem of confusing the whole field with radiotherapy. *Surgical neuroangiography* has the significant problem of narrowing the field by implication; in addition, the word *surgical* is semantically wrong in reference to what we understand as surgery, and the term *angiography* represents something having to do with recording of vascular images. Why not *surgical neuroradiology*? It is anticipated that other procedures in addition to the intravascular group may well be developed, such as percutaneous diskectomies and brain and spinal biopsies. The term *interventional neuroradiology* is not ideal, but it makes some sense. After all, the term *surgical intervention* is well accepted in many languages. One might include more of a manipulative implication in the name and call it *operative neuroradiology*. The term *radiology* should be preserved if at all possible. For that reason, the term *therapeutic neuroimaging*, which will eliminate the problem with the term *therapeutic neuroradiology*, is not good because the term *imaging* in itself means just that. The term *radiology*, on the other hand, has come to represent something broader. Thus, I would vote for continuing the term *interventional neuroradiology*, which has become fairly well accepted and, if for various reasons not discussed here, a change in name is desired, I think *surgical neuroradiology* is an appropriate designation.

In conclusion, the need for specially interested and trained individuals in the field of *interventional* or *surgical neuroradiology* has been created and is now recognized, and we must pay attention to what needs to be done to develop adequate services within our institutions. At the same time, in those centers where there is sufficient concentration of appropriate patients and trained personnel, we must develop and support training programs designed to provide the best possible background and experience for those who will then go to other centers to cover these needs. The acquisition of added skills requires a lengthening of the training period. The candidates should fully qualify for specialty boards.

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REFERENCES

1. Luessenhop AJ, Spencer WT. Artificial embolization of the cerebral arteries. Report of use in a case of arteriovenous malformation. *JAMA* **1960**;172:1153–1155
2. Hilal SK, Mount L, Correl J, et al. Therapeutic embolization of vascular malformations of the external carotid circulation clinical and experimental results. *Proceedings of the IX Symposium Neuroradiologicum*, Gothenburg, Sweden, September **1970**
3. Hilal SK, Michelsen S, Driller J, Lee A. Magnetically guided devices for the vascular exploration. Potentials and limitations. *Proceedings of the IX Symposium Neuroradiologicum*. Gothenburg, Sweden, September **1970**
4. Serbinenko FA. Balloon catheterization and occlusion of major cerebral vessels. *J Neurosurg* **1974**;41:125–145
5. Lasjaunius P. Opinion. Surgical neuroangiography: search for a specialty. *AJNR* **1987**;8:581–582